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Overhead in Economics and Accounting

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Editorial Department Note

In the not far away past, to expect that an accountant would have a conception of the relation of general business principles and conditions to his work, would have been looked upon by accountants as expecting a qualification which had no relation to their work and by employers as a forlorn hope. How rapid in both cases the change in point of view has been is easily discernible by comparing the accounting literature of ten years ago with that of the present time. Then the emphasis was placed on technique, method, accuracy, and the proof of accuracy. "Letter" perfection was the goal. Now, when one finds himself in a gathering of accountants discussing professional matters, during at least eighty percent of the time, he is not conscious of the fact that these his associates are accountants; for it is the broad aspects of business policies which are receiving consideration, how the facts upon which these policies rest can best be secured and by what means proper executive supervision over operations may be secured and maintained.

Our present publication treats of some phases of these broader aspects of accounting in its business and economic relationships. The author, Thomas H. Sanders, is particularly well qualified to speak on this subject. Educated in England, with graduate work completed at Harvard, and with business and research experience both abroad and here, he is a close student of business. The paper was delivered before a recent meeting of the Cleveland Chapter of the N. A. C. A. Mr. Sanders is Associate Professor of Accounting in the Graduate School of Business Administration, Harvard University.

OVERHEAD IN ECONOMICS AND ACCOUNTING

It is one of the commonplaces of economic discussions that modern business is now carried on through the agency of an enormous amount of plant and equipment as compared with that with which our forefathers operated, and that, arising out of the use of these fixed investments, business is loaded with heavy fixed charges which do not respond to fluctuations in output. Another outstanding fact is that the aggregate productive capacity of modern plants is greatly in excess of what the market can easily and regularly absorb. Nearly every firm is therefore at the point where a considerably increased business might be undertaken at a decreased cost per unit, if only a market could be found for that output.

Another fact of great importance which has to be faced is that this already heavy burden element will greatly increase in the future. It will increase not only in total amount but in the relative share of the total cost of any one article. This is to be expected in the course of our natural industrial progress, for that progress consists largely in providing workers with more and better equipment. The process will be still further hastened by the cutting off of the supply of cheap labor by means of a restricted immigration.

Already we are being told that the demand for labor is exceeding the supply, and that labor costs are mounting as labor becomes more scarce. For society as a whole this represents progress, but for the individual firm it presents a problem of mounting costs which in many cases becomes acute. It means that labor will tend to become replaced by labor-saving equipment. Whenever labor costs rise to a point beyond which the market for that product will not go, the leaders in that industry have no option except to develop cheaper processes by the aid of labor-saving devices, or else get out of the industry.

Nor should this be regarded as an undesirable feature. As already stated, it is a mark of social and industrial progress. From the standpoint of the country as a whole, the people are prosperous in proportion to the per capita investment in plant and equipment which is placed at the service of the workers, though, on account of the temporary difficulties and hardships which are likely to arise with individual groups of workers at the time the changes are made, this larger aspect is frequently overlooked. It is particularly evident, however, to anyone who is familiar with other nations, less advanced economically than ourselves. A traveler, for example, in China, Japan or India is immediately struck by two outstanding facts; one is the scarcity and crudity of the equipment with which the natives of those countries work, and the other is the poverty of the people. The two facts are inseparably tied together, and our people should welcome increases and improvements in their manufacturing equipment, in spite of the temporary displacements of labor.

For the individual firm, however, the presence of this extensive investment in plant and equipment constitutes a constant and serious problem; in fact, it dominates business policy at many important points. The difficulties are still further augmented by the presence, in many industries, of peak loads at certain seasons, necessitating an amount of equipment which at other periods of the year is largely idle. If this equipment could be permanently employed at full capacity both the individual business and the community would be better off. If it cannot be continuously employed the firm is still under the necessity of selling its product at a price which is sufficient to maintain the plant and equipment, or else it must go under. In every case the problem is a heavy one, so much so that writers among the economists are giving an increasing share of their attention to it.*

Before discussing this subject in greater detail, it will be well to differentiate in a broad way between the economic and the accounting concept of overhead. It should first be stated that many of the disputes about the content of overhead arise from confusing the economic with the accounting definition of cost. Economists, speaking of an industry as a whole, in its relation to society as a

* See "Economics of Overhead Costs," by J. M. Clark; University of Chicago Press.

whole, define cost as including all sacrifices which the industry must undergo to supply its product to the market; in this sense, interest on all capital, and even the profits which must reward the entrepreneur for his efforts and risks, are costs incurred by the industry, which must be met by those who use the products of that industry. It is particularly important to weigh economic costs before actually embarking upon a business. When once capital has been invested in the fixed assets of a specific industry, however, accountants usually consider that they serve the best purpose by defining costs as the outlays made for production, thus enabling them to ascertain whether there is any residue from gross income to cover interest on invested capital and profits for the proprietors.

In order to do an increased business, however, it is ordinarily necessary for a firm either to cut prices or else to gain some pre-eminence in the market by an unusually successful product, or equally successful marketing policy. Often the successful firm will do both of these things, but it is difficult for the average firm to accomplish either of them. In terms of economics, the desirable thing would be that all industries would increase their outputs simultaneously; in this way the activities of one industry would create the market for the product of another industry. As the economists say, the supply of one kind of goods is the demand for another kind of goods.

General movements of this sort are, however, for practical purposes impossible to bring about, and the individual firm must go ahead and take its chances regardless as to whether firms in other lines of business make corresponding moves. It is therefore necessary to inquire what the individual firm may do to better its own position in these circumstances.

The most obvious measure for increasing the demand for a firm's products is to cut the prices, a policy which is often and successfully followed, but which needs extreme care and foresight. It would not be worth while to cut prices to the point where the net profit on the increased output was smaller than the net profit on the lesser output had hitherto been. Moreover, it is not profitable to reduce prices if it is simply going to result in demoralizing the market by making buyers hold off in the expectation of still further reductions. Here, again, what is needed is an all-round reduction in prices simultaneously, not only by competitors in the same line of business, but by other industries surrounding them. In this way those who sell to the industry would reduce its costs by quoting lower prices to it, while those who buy from the industry would help along the marketing of the product by reducing their prices in turn. Here again, however, such general arrangements are practically impossible, not to mention the fact that they are frowned on by the law.

Ordinarily, therefore, decreased selling prices will be quoted by a firm not alone for the purpose of increasing its output under present conditions, but rather the lower prices will be quoted in

conjunction with improved methods of manufacture which have actually reduced production costs. In other words, lower prices will be a result of better manufacturing and marketing methods more often than they will be merely a cause of increased output while business difficulties remain the same.

Another line of thought which has recently been argued is that the big industrial concerns should distribute more of their gross earnings to employees as wages, and thus increase the demand for their products, rather than add to their surplus, and use it for still further additions to plant. It has been seen that the fundamental difficulty is the inability of the market to absorb an increased production. The market can be enabled to do better, it is said, only if the general body of the people have larger incomes, and the general body of the people can have larger incomes only if wages are increased over a wide area.* This argument is without doubt fundamentally sound, but few firms are individually strong enough to take the initiative in such a course without receiving a good deal of collateral support, not only from other firms, but from other industries. In this connection, however, it is noteworthy that Henry Ford, with the usual courage of his convictions, has increased wages because, it is said, he believed that otherwise we might be approaching an era of declining trade. Few firms, however, have similar resources; nevertheless, this policy might well be considered by the more powerful businesses of the country.

This expression "discrimination" has been borrowed from Professor Clark's book, cited above. It does not for present purposes refer to unfair or illegal discriminations, such as the Interstate Commerce Commission had to suppress in the railroads years ago. It has reference to "charging what the traffic will bear" in the sense of making charges in proportion to the services rendered. Railroads, for instance, have their classifications of more and less valuable freight, which can be charged a different tariff. Electric companies and telephone companies may make lower charges for night services; the department stores may hold their January sales; and so on all along the line. The principle is that, at points where the utility of the product to the customer diminishes, or sales resistance increases, prices are lowered to meet what otherwise would be a greatly decreased demand. The principle is of very wide application; almost any business may make appeal to different classes of consumers at different price levels, the ultimate object being in all cases to find work for otherwise idle equipment.

It is to be remembered that the objective in all these policies is to find the product which can absorb burden which at present is unabsorbed. That being so, the figures of the cost department must be relied upon to set the limits for these policies in various directions. In particular, they must establish the point at which prices are no longer high enough to make any contribution to the

* See "Profits," by Foster and Catchings; Houghton-Mifflin Company.

meeting of the burden charges. Such computations will require that the cost department shall make very careful distinctions between fixed charges and variable charges, and, among the latter, that they shall determine as closely as possible how greatly they vary with increases in output. Unless the cost department is able to supply definite information on these points, it is likely that some of the manœuvering of the sales department will be carried on at a loss, and that the situation will be made worse instead of being improved. While, therefore, it is true that the problem is largely a sales problem, as regards determining what the response of the market is likely to be, yet it is not safe for the sales department to act without being constantly in touch with the cost department.

If it should transpire that, in spite of all these efforts, there appears to be a permanently idle capacity, it will be necessary for the directors to look for a correspondingly permanent remedy, in the shape of a new product. This new product, obviously must be such that it can be manufactured by the idle equipment with a minimum of change or addition; and further, it should, so far as possible, be such that it can be marketed through approximately the same channels as the older products. An element of weakness is introduced if a secondary organization must be set up to handle the new product, thus dividing the interest and distracting the attention of the directors.

The situation also has a bearing upon the practice, now becoming common among cost accountants, of budgeting normal amounts of burden, and from them of determining normal burden rates. It is seen that the definition of unabsorbed burden will depend almost wholly upon how these normal rates are set. The first thing necessary for a normal year in an ordinary business is that it shall earn a fair average return of net profit upon the capital investment in it; a year which does not give such a return should not be regarded as normal. The normal need not be the exact average of a number of years past; the average business will expect to grow, and the normal computed should take that fact into account. The volume of business which will meet the average expectations of the proprietors, and give them a normal profit, should also be used as the basis upon which to compute the burden rate. This will mean, if the burden expenses have been correctly estimated, that the total burden will be exactly absorbed in a normal year. It will mean, in any year, that an amount of burden will be charged against production, proportioned to the volume of business done. The balance of the burden account, representing overabsorbed or unabsorbed burden will indicate where the business stands during that year as compared with a normal year.

It would appear that this first step, the estimating of a normal amount of burden expense, and the determining of a normal output upon which the burden should be distributed, is the most important step of all in the handling of burden. No other part of the burden

computations is likely to influence the results drawn from the cost figures so greatly as this one factor.

Nevertheless, it is important, in many cases, to make a correct distribution of burden to the several departments. Where job, order, or lot costs are used, and where the different products engage the different departments for varying times and to varying extent, it makes an actual dollars and cents difference in the costs of the several products to make a correct departmental distribution, rather than to use a blanket rate for all products and all departments.

In the case of process costs, where a single product goes through the same series of processes, always by the same route, and in the same period of time, it might appear that it was unnecessary to bring down the overhead into departments; the total cost of a product will be unaffected thereby. But even in such cases, it is frequently found useful to show separately the costs of the various departments or sections of the processes, especially for two reasons; first to keep a check upon the costs of the various departments from time to time, and second, to help direct research work undertaken for the purpose of improving or cheapening the processes. For the latter purpose the departmental costs will help to indicate where savings are most likely to be made.

In this connection it might be well also to mention the case of joint costs, where two or more products emerge from the same processes in such a way that no physical basis is available on which to cost them separately. If the second product is a true by-product, small in amount relatively to the main product, it may well be credited to the manufacturing account at what it will fetch in the market, leaving the rest of the manufacturing charges to fall upon the principal product. If both products are of considerable importance, so that it is hoped to make a profit on each, it becomes desirable to show a cost for each. In such cases it would seem to be in accord with economic principles to divide the total process cost between the two products in proportion to their subsequent selling values. It is for this sales value that manufacturing processes are undertaken, and if one product realizes more than the other product in the market, then more proportionately is the expenditure undertaken for the first product than for the second.

Some people object to this relating of costs to market values; they even assert that it is an abandonment of the true cost basis. The latter statement is not true at all; the amount which is apportioned is the total cost of the two products, and it cannot be said that any method of apportioning their total cost is an abandonment of the cost basis. The apportionment of the total cost on the basis of the selling prices to be realized seems to be in agreement with economic principles relating to that subject.

In discussing the question of the necessity and advantage of making a departmental distribution of overhead, it is necessary to make a distinction between purely departmental overhead and

items which are general to the entire plant, and must be apportioned on some arbitrary basis. There are many occasions when it is desirable to show the immediate departmental overhead, when it may be unnecessary to include therein any prorated items.

Considering again the case of job costs where different products spend different periods in the various departments, a prorating of general manufacturing items is necessary in order to get correct departmental totals, for the purpose of establishing departmental burden rates which will give accurate charges to the products.

With process costs the prorating of general charges seems less necessary. It has already been stated that departmental costs are shown in this case for the purpose of indicating the departmental efficiency, and for the purpose of pointing out where economies might possibly be effected by improved methods of manufacture. The matter of efficiency will in practice probably be covered by a series of departmental cost reports, and it has frequently been found that prorated items, included in such departmental reports, tend to diminish their usefulness rather than to increase it. Such prorated amounts are frequently not understood by the departmental foremen, who feel that in any case they are not responsible for these amounts, and can see no reason why such things should be called to their attention. In the matter of research work it is evidently sufficient to show the immediate costs of the department, without adding any arbitrary amounts by prorating.

In making such departmental reports it is more necessary to have a fairly definite idea as to how the cost figures should vary with changes in the amount of product handled, than it is to make prorations to the department on any particular basis. Many firms are giving thought to this question of the behaviour of overhead, and some of them have worked out charts showing how the cost per unit is likely to move with increased or decreased output.

Another case where prorating of items to departments is less necessary than some others, is where the physical or engineering processes and conditions of manufacture practically determine the costs. This idea is perhaps best illustrated by the assembly of Ford cars. With the product moving constantly at a certain predetermined speed, and all operations regularly performed, each at a uniform speed, and a certain number of workmen employed along the route, this becomes practically a process cost. The cost per unit is the total cost of operating the process divided by the number of cars turned out during the period, and if the moving belt travels steadily at the same speed, there can be no variation in the cost of the assembly operation. In all cases of this sort it is not necessary to make very detailed or frequent burden statements; the burden is predetermined and constant unless and until some change takes place in the method of operating. This, however, cannot be made to apply to all manufacturing plants, or even to the majority of

plants. In a recently published article, Mr. Ford expressed his disapproval of private offices for foremen, of reports made on paper, and of clerical work generally within the factory. He stated that the business of the factory executives was to keep the tools in order, and not to read reports. This is true under the conditions described above, which he had in mind. It is true in all conditions that the business of the production executives is to produce; and cost reports or any other reports, are useless unless they facilitate production. With varied products, however, and very much less opportunity for standardization than is possible in the case of manufacturing a Ford, it is frequently found desirable and necessary that the foremen and superintendents should be constantly advised of what is going on, and of the costs of operations, in order that attention may be called to special orders which for some reason are out of line. A plant making a great variety of products must use all the machinery of planning, routing, and scheduling its work, and of cost accounting to see that the various operations do not run away with more money than has been anticipated.

As a final remark on departmental distribution, it may be observed that if and when it is deemed desirable to distribute general overhead to departments, this task can be done with very much less trouble than would be supposed from hearing the protests of those who object to it. Moreover, when it has once been done the computations are good until some change in the general set-up of the factory takes place.

There remains only to determine the most accurate rate by which the burden of the department may be allocated to its product. It is not necessary here to enumerate the various methods in detail, but only to point out one or two features. It is probable that in many cases it makes very little difference as to which base is adopted for the computation of the rate; the same arithmetical result would be obtained from any one of several methods. In such case, of course, they will select the method which is easiest to operate in conjunction with their other cost accounting activities. Before this is done, however, the cost accountant should make a number of computations for the purpose of assuring himself that the basis he has selected really is as accurate as any other.

As a general rule a burden rate computed upon a time basis, that is, a labor hour or a machine hour, will be more accurate than a rate computed upon another basis, such as value. This is true for the reason that most of the burden items accrue on a time basis; depreciation, taxes, insurance, salaries of supervisors, and such like items are computed by the week, month, or year. Products should therefore be charged with these items in proportion to the time for which these products engage the services of the departments in which they are made. There has been some reluctance to use machine-hour rates, again under the impression that this is a complicated procedure. But where the machine is the principal agency in production, and labor is employed merely in feeding and

tending the machine, the machine rate becomes the natural basis for charges to the product. Here again it may be stated that the difficulties of the computation have been greatly exaggerated. The same sort of rates is used to compute the real cost of operating furnaces in a brass foundry, and for similar units of plant.

One other question arises, and that is as to how often the burden rates should be changed. The answer to this question has been largely furnished by the discussion in the earlier parts of this paper. Burden rates will not be changed unless there is some permanent change in the cost conditions, caused either by some elements of cost being permanently changed, or else by a change in the method of manufacture itself. If it be agreed that one of the main purposes of cost accounting for burden is to show the extent of the variations from normal, then the burden rates will not be changed because of fluctuations in output; rather they will be used as a measure of the extent and direction of those fluctuations and their cost.